

## SEQUENCE LISTING

JC20 Rec'd PCT/PTO 14 OCT 2009

<110> Agriculture Victoria Services Pty Ltd  
 AgResearch Limited  
 Spangenberg, German  
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 Winkworth, Amanda  
 Panter, Stephen

<120> Chalcone synthase dihydroflavonol-4-reductase and  
 leucoanthrocyanidine reductase for clover, medic  
 rygrass or fescue

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<150> 2003901797  
 <151> 2003-04-14

<150> 2003904369  
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<170> PatentIn version 3.2

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Lys Thr Glu Leu Lys Glu Lys Phe Gln Arg Met Cys Asp Lys Ser Met  
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Ile Lys Ser Arg Tyr Met Tyr Leu Thr Glu Glu Ile Leu Lys Glu Asn  
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Pro Ser Leu Cys Glu Tyr Met Ala Pro Ser Leu Asp Ala Arg Gln Asp  
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Met Val Val Val Glu Val Pro Arg Leu Gly Lys Glu Ala Ala Val Lys  
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Ala Ile Lys Glu Trp Gly Gln Pro Lys Ser Lys Ile Thr His Leu Ile  
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Phe Cys Thr Thr Ser Gly Val Asp Met Pro Gly Ala Asp Tyr Gln Leu  
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Gln Gln Gly Cys Phe Ala Gly Gly Thr Val Leu Arg Leu Ala Lys Asp  
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Leu Val Gly Gln Ala Leu Phe Gly Asp Gly Ala Ala Ala Leu Ile Val  
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Gly Ser Asp Pro Val Pro Glu Ile Glu Lys Pro Ile Phe Glu Met Val  
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Trp Thr Ala Gln Thr Ile Ala Pro Asp Ser Glu Gly Ala Ile Asp Gly  
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His Leu Arg Glu Ala Gly Leu Thr Phe His Leu Leu Lys Asp Val Pro  
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<213> Trifolium repens

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35 40 45

Asp Asn Pro Glu Leu Lys Gln Lys Leu Ala Arg Leu Cys Lys Thr Thr  
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Thr Val Lys Thr Arg Tyr Val Val Met Asn Glu Glu Ile Leu Lys Lys  
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Tyr Pro Glu Leu Val Val Glu Gly Ala Ser Thr Val Lys Gln Arg Leu  
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Glu Ile Cys Asn Glu Ala Val Thr Gln Met Ala Ile Glu Ala Ser Gln  
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Val Cys Leu Lys Asn Trp Gly Arg Ser Leu Ser Asp Ile Thr His Val  
115 120 125

Val Tyr Val Ser Ser Ser Glu Ala Arg Leu Pro Gly Gly Asp Leu Tyr  
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Leu Ser Lys Gly Leu Gly Leu Asn Pro Lys Ile Gln Arg Thr Met Leu  
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Tyr Phe Ser Gly Cys Ser Gly Gly Val Ala Gly Leu Arg Val Ala Lys  
165 170 175

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180 185 190

Glu Thr Thr Ile Ile Gly Phe Lys Pro Pro Ser Val Asp Arg Pro Tyr  
195 200 205

Asp Leu Val Gly val Ala Leu Phe Gly Asp Gly Ala Gly Ala Met Ile  
210 215 220

Ile Gly Ser Asp Pro Val Phe Glu Thr Glu Thr Pro Leu Phe Glu Leu  
225 230 235 240

His Thr Ser Ala Gln Glu Phe Ile Pro Asp Thr Glu Lys Lys Ile Asp  
245 250 255

Gly Arg Leu Thr Glu Glu Gly Ile Ser Phe Thr Leu Ala Arg Glu Leu  
260 265 270

Pro Gln Ile Ile Glu Asp Asn Val Glu Gly Phe Cys Asn Lys Leu Ile  
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Asp Val Val Gly Leu Glu Asn Lys Glu Tyr Asn Lys Leu Phe Trp Ala  
290 295 300

Val His Pro Gly Gly Pro Ala Ile Leu Asn Arg Val Glu Lys Arg Leu  
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Glu Leu Ser Pro Gln Lys Leu Asn Ala Ser Arg Lys Ala Leu Met Asp  
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Tyr Gly Asn Ala Ser Ser Asn Thr Ile Val Tyr Val Leu Glu Tyr Met  
340 345 350

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 35 40 45

Phe Ile Arg Asp Thr Lys Cys Asp Asp Thr Tyr Ile Lys Glu Lys Leu  
 50 55 60

Glu Arg Leu Cys Lys Asn Thr Thr Val Lys Thr Arg Tyr Thr Val Met  
 65 70 75 80

Ser Lys Glu Ile Leu Asp Asn Tyr Pro Glu Leu Ala Ile Asp Gly Thr  
85 90 95

Pro Thr Ile Arg Gln Lys Leu Glu Ile Ala Asn Pro Ala Val Val Glu  
100 105 110

Met Ala Thr Arg Ala Ser Lys Asp Cys Ile Lys Glu Trp Gly Arg Ser  
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Pro Gln Asp Ile Thr His Ile Val Tyr Val Ser Ser Ser Glu Ile Arg  
130 135 140

Leu Pro Gly Gly Asp Leu Tyr Leu Ala Asn Glu Leu Gly Leu Asn Ser  
145 150 155 160

Asp Val Asn Arg Val Met Leu Tyr Phe Leu Gly Cys Tyr Gly Gly Val  
165 170 175

Thr Gly Leu Arg Val Ala Lys Asp Ile Ala Glu Asn Asn Pro Gly Ser  
180 185 190

Arg Val Leu Leu Thr Thr Ser Glu Thr Thr Ile Leu Gly Phe Arg Pro  
195 200 205

Pro Ser Lys Ala Arg Pro Tyr Asp Leu Val Gly Ala Ala Leu Phe Gly  
210 215 220

Asp Gly Ala Ala Ala Ala Ile Ile Gly Thr Asp Pro Ile Leu Asn Gln  
225 230 235 240

Glu Ser Pro Phe Met Glu Leu Asn His Ala Val Gln Lys Phe Leu Pro  
245 250 255

Asp Thr Gln Asn Val Ile Asp Gly Arg Ile Thr Glu Glu Gly Ile Asn  
260 265 270

Phe Lys Leu Gly Arg Asp Leu Pro Gln Lys Ile Glu Asp Asn Ile Glu  
275 280 285

Glu Phe Cys Lys Lys Ile Met Ala Lys Ser Asp Val Lys Glu Phe Asn  
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Asp Leu Phe Trp Ala Val His Pro Gly Gly Pro Ala Ile Leu Asn Lys  
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Leu Glu Asn Ile Leu Lys Leu Lys Ser Asp Lys Leu Asp Cys Ser Arg  
 325 330 335

Lys Ala Leu Met Asp Tyr Gly Asn Val Ser Ser Asn Thr Ile Phe Tyr  
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Val Met Glu Tyr Met Arg Asp Tyr Leu Lys Glu Asp Gly Ser Glu Glu  
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 Page 12

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Ile Lys Lys Arg Tyr Met His Leu Thr Glu Asp Phe Leu Lys Glu Asn  
65 70 75 80

Pro Asn Met Cys Glu Tyr Met Ala Pro Ser Leu Asp Val Arg Arg Asp  
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Ile Val Val Val Glu Val Pro Lys Leu Gly Lys Glu Ala Ala Lys Lys  
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Ala Ile Cys Glu Trp Gly Gln Pro Lys Ser Lys Ile Thr His Leu Val  
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Phe Cys Thr Thr Ser Gly Val Asp Met Pro Gly Ala Asp Tyr Gln Leu  
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Thr Lys Leu Leu Gly Leu Lys Pro Ser Val Lys Arg Leu Met Met Tyr  
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Gln Gln Gly Cys Phe Ala Gly Gly Thr Val Leu Arg Leu Ala Lys Asp  
165 170 175

Leu Val Glu Asn Asn Lys Asn Ala Arg Val Leu Val Val Cys Ser Glu  
Page 14

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gccgagctca tatatttctt gcagagaaaag aatcagcttc tggtagatac atttgctgtg 900  
  
ctcacaatac tagtgttccc gagcttgcaa agtttctcaa caaacgatat cctcagtata 960  
  
aagttccaac tgaatttgat gattgcccc acaaggcaaa gttgataatc tcttctgaaa 1020  
  
agcttatcaa agaaggggtc agtttcaagc atgggtattgc cgaaactttc gaccagactg 1080



tcgagtattt taagactaag ggggcactga agaattagat tttgatattt ctaattcaat 1140  
agcaaactct aagcttggtta tgtgtttgtg aagttcagag tgaaatatca aatgaataag 1200  
tggagagagc acaataagag gagagcacia taattttgga aaaaaaaaaa aaaaaaaaaa 1260  
aaaaaaaaagt actctgcgtt gttaccactg cttaatcact agtgaattc 1309

<210> 10  
<211> 338  
<212> PRT  
<213> Trifolium repens

<400> 10

Met Ala Ser Ile Lys Gln Ile Gly Asn Lys Lys Ala Cys Val Ile Gly  
1 5 10 15

Gly Thr Gly Phe Val Ala Ser Met Leu Ile Lys Gln Leu Leu Glu Lys  
20 25 30

Gly Tyr Ala Val Asn Thr Thr Val Arg Asp Pro Asp Ser Pro Lys Lys  
35 40 45

Ile Ser His Leu Val Ala Leu Gln Ser Leu Gly Glu Leu Asn Leu Phe  
50 55 60

Arg Ala Asp Leu Thr Val Glu Glu Asp Phe Asp Ala Pro Ile Ala Gly  
65 70 75 80

Cys Glu Leu Val Phe Gln Leu Ala Thr Pro Val Asn Phe Ala Ser Gln  
85 90 95

Asp Pro Glu Asn Asp Met Ile Lys Pro Ala Ile Lys Gly Val Leu Asn  
100 105 110

Val Leu Lys Ala Ile Ala Arg Ala Lys Glu Val Lys Arg Val Ile Leu  
115 120 125

Thr Ser Ser Ala Ala Ala Val Thr Ile Asn Glu Leu Lys Gly Thr Gly  
130 135 140

His Val Met Asp Glu Thr Asn Trp Ser Asp Val Glu Phe Leu Asn Thr  
145 150 155 160

Ala Lys Pro Pro Thr Trp Gly Tyr Pro Ala Ser Lys Met Leu Ala Glu  
165 170 175

Lys Ala Ala Trp Lys Phe Ala Glu Glu Asn Asp Ile Asp Leu Ile Thr  
180 185 190

Val Ile Pro Ser Leu Thr Thr Gly Pro Ser Leu Thr Pro Asp Ile Pro  
195 200 205

Ser Ser Val Gly Leu Ala Met Ser Leu Ile Thr Gly Asn Asp Phe Leu  
210 215 220

Ile Asn Ala Leu Lys Gly Met Gln Phe Leu Ser Gly Ser Leu Ser Ile  
225 230 235 240

Thr His Val Glu Asp Ile Cys Arg Ala His Ile Phe Leu Ala Glu Lys  
245 250 255

Glu Ser Ala Ser Gly Arg Tyr Ile Cys Cys Ala His Asn Thr Ser Val  
260 265 270

Pro Glu Leu Ala Lys Phe Leu Asn Lys Arg Tyr Pro Gln Tyr Lys Val  
275 280 285

Pro Thr Glu Phe Asp Asp Cys Pro Ser Lys Ala Lys Leu Ile Ile Ser  
290 295 300

Ser Glu Lys Leu Ile Lys Glu Gly Phe Ser Phe Lys His Gly Ile Ala  
305 310 315 320

Glu Thr Phe Asp Gln Thr Val Glu Tyr Phe Lys Thr Lys Gly Ala Leu  
325 330 335

Lys Asn

<210> 11  
<211> 1409  
<212> DNA  
<213> *Trifolium repens*

<400> 11  
gaattcgatt aagcagtggg aacaacgcag agtacgcggg gataccaaca ttgtcacaat 60  
  
taactctaaa agcaaagcaa tggcaccagc agcaacatca tcaccaacca ctctactac 120  
  
taccaagggt cgtgtcctaa ttgttggagg aacaggtttc attggaaaat ttgtaactga 180  
  
ggcaagtctt tccacaacac acccaacctt cttgttgggt cggccaggac ctcttctctc 240  
  
ttctaaggct gccactatta aggcattcca agagaaagggt gccattgtca tttatggtcg 300  
  
ggtaaataat aaggagttca tggagatgat tttgaaaaag tatgagataa atgtagtcat 360  
  
ttctgcaata ggaggctctg atggcttgct ggaacagctt actttggtgg aggccatgaa 420  
  
atctattaac accattaaga ggtttttgcc ttcggaattt ggtcacgatg tggacagagc 480  
  
aaatcctgtg gaacctggcc taacaatgta caaacagaaa cgtttggtta gacgtgtgat 540  
  
cgaagaatct ggtataccat acacctacat ctgttgcaat tcgatcgcat cttggccgta 600  
  
ctatgacaat tgtcatccat cacagcttcc tccaccgttg gatcaattac atatttatgg 660  
  
tcatggcgat gtcaaagctt actttgttga tggctatgat attgggaaat tcacaatgaa 720  
  
ggtcattgat gatgaaagaa caatcaacaa aaatgttcat tttcgacctt ctaacaattg 780  
  
ttatagcatg aatgagcttg cttctttgtg ggaaaacaaa attgcacgaa aaattcctag 840  
  
agtgatcgtc tctgaagacg atcttctagc aatagccgca gaaaattgca taccggaaag 900  
  
tgctgtggca ccaatcactc atgatatatatt catcaatgga tgtcaagtta acttcaagat 960  
  
agatggaatt catgatgttg aaattggcac tctatatcct ggtgaatcgg taagaagttt 1020

ggaggaatgc tatgagaaat ttgttgtcat ggcggctgac aagattcata aagaagaaac 1080  
 tggagttacc gcaggtgggg gcggcacaac ggctatggta gagccggtgc caatcacagc 1140  
 ttcctgttga aaaggttcac ctgaggtgga tattcttttg agtcataaga catgttgatt 1200  
 gttgatgttg ttttcaagaa tgtttcatca tttcatgtgt tttattaatc ctaagtacaa 1260  
 ataattgctg tctacgtacg ttcttagttg caaaaattct tgttattctc tattgaggta 1320  
 aaagtcttca tgtttacaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaagt actctgcgtt 1380  
 gttaccactg cttaatcact agtgaattc 1409

<210> 12  
 <211> 356  
 <212> PRT  
 <213> Trifolium repens

<400> 12

Met Ala Pro Ala Ala Thr Ser Ser Pro Thr Thr Pro Thr Thr Thr Lys  
 1 5 10 15

Gly Arg Val Leu Ile Val Gly Gly Thr Gly Phe Ile Gly Lys Phe Val  
 20 25 30

Thr Glu Ala Ser Leu Ser Thr Thr His Pro Thr Tyr Leu Leu Val Arg  
 35 40 45

Pro Gly Pro Leu Leu Ser Ser Lys Ala Ala Thr Ile Lys Ala Phe Gln  
 50 55 60

Glu Lys Gly Ala Ile Val Ile Tyr Gly Arg Val Asn Asn Lys Glu Phe  
 65 70 75 80

Met Glu Met Ile Leu Lys Lys Tyr Glu Ile Asn Val Val Ile Ser Ala  
 85 90 95

Ile Gly Gly Ser Asp Gly Leu Leu Glu Gln Leu Thr Leu Val Glu Ala  
 100 105 110

Met Lys Ser Ile Asn Thr Ile Lys Arg Phe Leu Pro Ser Glu Phe Gly  
115 120 125

His Asp Val Asp Arg Ala Asn Pro Val Glu Pro Gly Leu Thr Met Tyr  
130 135 140

Lys Gln Lys Arg Leu Val Arg Arg Val Ile Glu Glu Ser Gly Ile Pro  
145 150 155 160

Tyr Thr Tyr Ile Cys Cys Asn Ser Ile Ala Ser Trp Pro Tyr Tyr Asp  
165 170 175

Asn Cys His Pro Ser Gln Leu Pro Pro Pro Leu Asp Gln Leu His Ile  
180 185 190

Tyr Gly His Gly Asp Val Lys Ala Tyr Phe Val Asp Gly Tyr Asp Ile  
195 200 205

Gly Lys Phe Thr Met Lys Val Ile Asp Asp Glu Arg Thr Ile Asn Lys  
210 215 220

Asn Val His Phe Arg Pro Ser Asn Asn Cys Tyr Ser Met Asn Glu Leu  
225 230 235 240

Ala Ser Leu Trp Glu Asn Lys Ile Ala Arg Lys Ile Pro Arg Val Ile  
245 250 255

Val Ser Glu Asp Asp Leu Leu Ala Ile Ala Ala Glu Asn Cys Ile Pro  
260 265 270

Glu Ser Val Val Ala Pro Ile Thr His Asp Ile Phe Ile Asn Gly Cys  
275 280 285

Gln Val Asn Phe Lys Ile Asp Gly Ile His Asp Val Glu Ile Gly Thr  
290 295 300

Leu Tyr Pro Gly Glu Ser Val Arg Ser Leu Glu Glu Cys Tyr Glu Lys  
305 310 315 320

Phe Val Val Met Ala Ala Asp Lys Ile His Lys Glu Glu Thr Gly Val  
 325 330 335

Thr Ala Gly Gly Gly Gly Thr Thr Ala Met Val Glu Pro Val Pro Ile  
 340 345 350

Thr Ala Ser Cys  
 355

<210> 13  
 <211> 1551  
 <212> DNA  
 <213> Trifolium repens

<400> 13  
 gaattcgatt aagcagtggg aacaacgcag agtacgcggg aggatccttc cattttgcat 60  
 accaacattg tcacaattaa ctctaaaagc aaagcaatgg caccagcagc aacatcatca 120  
 ccaaccactc ctactactac caagggctcgt gtcctaattg ttggaggaac aggtttcatt 180  
 ggaaaatttg taactgaggc aagtctttcc acaacacacc caacctactt gttggttcgg 240  
 ccaggacctc ttctctcttc taaggctgcc actattaagg cattccaaga gaaaggtgcc 300  
 attgtcattt atggtcgggt aaataataag gagttcatgg agatgatttt gaaaaagtat 360  
 gagataaatg tagtcatttc tgcaatagga ggctctgatg gcttgctgga acagcttact 420  
 ttggtggagg ccatgaaatc tattaacacc attaagaggt ttttgccttc agaatttggt 480  
 cacgatgtgg acagagcaaa tcctgtggaa cctggcctaa caatgtacaa acagaaacgt 540  
 ttggttagac gtgtgatcga agaatctggg gtaccatata cctacatctg ttgcaattcg 600  
 atcgcatcct ggccgtacta tgacaattgt catccatcac agcttcctcc accgttggat 660  
 caattacata tttatgggtc tggcgaatgc aaagcttact ttgttgatgg ctatgatatt 720  
 gggaaattca caatgaaggt cattgatgat gaaagaacaa tcaacaaaaa tgttcatttt 780

cgaccttcta acaattgtta tagcatgaat gagcttgctt ctttgtggga aaacaaaatt 840  
 gcacgaaaaa ttcctagagt gatcgtctct gaagacgac ttctagcaat agccgcagaa 900  
 aactgcatac cggaaagtgt tgtggcatca atcactcatg atatattcat caatggatgt 960  
 caagttaact tcaaggtaga tggaattcat gatgttgaaa ttggcactct atatcctggt 1020  
 gaatcggtaa gaagtttgga ggaatgctat gagaaatttg ttgtcatggc ggctgacaag 1080  
 attcataaag aagaaactgg agttaccgca ggtgggggcg gcacaacggc tatggtagag 1140  
 ccggtgccaa tcacagcttc ctgttgaaaa gggtcacctg aggtggatat tcttttgagt 1200  
 cataagacat gttgattggt gatgttggtt tcaagaatgt ttcatcattt catgtgtttt 1260  
 attaatccta agtacaata attgctgtct acgtacgttc ttagttgcga aaattcttgt 1320  
 tattctctat tggggtaaaa gtcttcatgt ttattgtagt tgtgttggtt tttcatatat 1380  
 gctatttgca ataatgattt ttgtgaagca cttgtggtgt atttacttac tactgaaaat 1440  
 aatggttaca caaatatat aaaaaataa aaataagcaa aaaaaaaaaa aaaaaaaaaa 1500  
 aaaaaaaaaa gtactctgcg ttgttaccac tgcttaatca ctagtgaatt c 1551

<210> 14  
 <211> 356  
 <212> PRT  
 <213> Trifolium repens

<400> 14

Met Ala Pro Ala Ala Thr Ser Ser Pro Thr Thr Pro Thr Thr Thr Lys  
 1 5 10 15

Gly Arg Val Leu Ile Val Gly Gly Thr Gly Phe Ile Gly Lys Phe Val  
 20 25 30

Thr Glu Ala Ser Leu Ser Thr Thr His Pro Thr Tyr Leu Leu Val Arg  
 35 40 45

Pro Gly Pro Leu Leu Ser Ser Lys Ala Ala Thr Ile Lys Ala Phe Gln  
50 55 60

Glu Lys Gly Ala Ile Val Ile Tyr Gly Arg Val Asn Asn Lys Glu Phe  
65 70 75 80

Met Glu Met Ile Leu Lys Lys Tyr Glu Ile Asn Val Val Ile Ser Ala  
85 90 95

Ile Gly Gly Ser Asp Gly Leu Leu Glu Gln Leu Thr Leu Val Glu Ala  
100 105 110

Met Lys Ser Ile Asn Thr Ile Lys Arg Phe Leu Pro Ser Glu Phe Gly  
115 120 125

His Asp Val Asp Arg Ala Asn Pro Val Glu Pro Gly Leu Thr Met Tyr  
130 135 140

Lys Gln Lys Arg Leu Val Arg Arg Val Ile Glu Glu Ser Gly Val Pro  
145 150 155 160

Tyr Thr Tyr Ile Cys Cys Asn Ser Ile Ala Ser Trp Pro Tyr Tyr Asp  
165 170 175

Asn Cys His Pro Ser Gln Leu Pro Pro Pro Leu Asp Gln Leu His Ile  
180 185 190

Tyr Gly His Gly Asp Val Lys Ala Tyr Phe Val Asp Gly Tyr Asp Ile  
195 200 205

Gly Lys Phe Thr Met Lys Val Ile Asp Asp Glu Arg Thr Ile Asn Lys  
210 215 220

Asn Val His Phe Arg Pro Ser Asn Asn Cys Tyr Ser Met Asn Glu Leu  
225 230 235 240

Ala Ser Leu Trp Glu Asn Lys Ile Ala Arg Lys Ile Pro Arg Val Ile  
245 250 255



Val Ser Glu Asp Asp Leu Leu Ala Ile Ala Ala Glu Asn Cys Ile Pro  
 260 265 270

Glu Ser Val Val Ala Ser Ile Thr His Asp Ile Phe Ile Asn Gly Cys  
 275 280 285

Gln Val Asn Phe Lys Val Asp Gly Ile His Asp Val Glu Ile Gly Thr  
 290 295 300

Leu Tyr Pro Gly Glu Ser Val Arg Ser Leu Glu Glu Cys Tyr Glu Lys  
 305 310 315 320

Phe Val Val Met Ala Ala Asp Lys Ile His Lys Glu Glu Thr Gly Val  
 325 330 335

Thr Ala Gly Gly Gly Gly Thr Thr Ala Met Val Glu Pro Val Pro Ile  
 340 345 350

Thr Ala Ser Cys  
 355

<210> 15  
 <211> 1384  
 <212> DNA  
 <213> Trifolium repens

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taactctaaa agtaaagcaa tggcaccagc agcaacatca tcaccaacca ctcccactac	120
taccaagggt cgtgtcctaa ttgttgagg aacaggtttc attggaaaat ttgtaactga	180
ggcaagtctt tccacaacac acccaaccta cttgttggtt cggccaggac ctcttctctc	240
ttctaaggct gccactatta aggcattcca agagaaagggt gccattgtca tttatgggtcg	300
ggtaaataat aaggagttca tggagatgat tttgaaaaag tatgagataa atgtagtcac	360
ttctgcaata ggaggctctg atggcttgct ggaacagctt actttggtgg aggccatgaa	420

atctattaac accattaaga ggTTTTTgcc ttcggaattt ggtcacgatg tggacagagc 480  
 agatcctgtg gaacctggcc taacaatgta caaacagaaa cgTTTggtta gacgtgtgat 540  
 cgaagaatct ggtataccat acacctacat ctgTTgcaat tcgatcgcat cttggccgta 600  
 ctatgacaat tgtcatccat cacagcttcc tccaccgttg gatcaattac atatttatgg 660  
 tcatggcgat gtcaaagctt actTTgttga tggctatgat attgggaaat tcacaatgaa 720  
 ggtcattgat gatgaaagaa caatcaacaa aaatgttcat tttcgacctt ctaacaattg 780  
 ttatagcatg aatgagcttg cttctTTgtg ggaaaacaaa attgcacgaa aaattcctag 840  
 agtgatcgtc tctgaagacg atcttctagc aatagccgca gaaaattgca taccggaaag 900  
 tgtcgtggca ccaatcactc atgatatatt catcaatgga tgtcaagtta acttcaagat 960  
 agatggaatt catgatgttg aaattggcac tctatattctt ggtgaatcgg taagaagttt 1020  
 ggaggaatgc tatgagaaat ttgttgtcat ggcggctgac aagattcata aagaagaaac 1080  
 tggagttacc gcaggtgggg gcggcacaac ggctatggta gagccggtgc caatcacagc 1140  
 ttctgttga aaaggttcac ctgaggtgga tattctTTTt agtcataaga catgttgatt 1200  
 gttgatgttg ttttcaagaa tgTTTcatca tttcatgtgt tttattaatc ctaagtacaa 1260  
 ataattgctg tctacgtacg ttcttagttg caaaaattct tgTTattctc tatcaaaaaa 1320  
 aaaaaaaaaa aaaaaaaaaa aaagtactct gcgttgttac cactgcttaa tcactagtga 1380  
 attc 1384

<210> 16  
 <211> 356  
 <212> PRT  
 <213> Trifolium repens

<400> 16

Met Ala Pro Ala Ala Thr Ser Ser Pro Thr Thr Pro Thr Thr Thr Lys  
 1 5 10 15

Gly Arg Val Leu Ile Val Gly Gly Thr Gly Phe Ile Gly Lys Phe Val  
20 25 30

Thr Glu Ala Ser Leu Ser Thr Thr His Pro Thr Tyr Leu Leu Val Arg  
35 40 45

Pro Gly Pro Leu Leu Ser Ser Lys Ala Ala Thr Ile Lys Ala Phe Gln  
50 55 60

Glu Lys Gly Ala Ile Val Ile Tyr Gly Arg Val Asn Asn Lys Glu Phe  
65 70 75 80

Met Glu Met Ile Leu Lys Lys Tyr Glu Ile Asn Val Val Ile Ser Ala  
85 90 95

Ile Gly Gly Ser Asp Gly Leu Leu Glu Gln Leu Thr Leu Val Glu Ala  
100 105 110

Met Lys Ser Ile Asn Thr Ile Lys Arg Phe Leu Pro Ser Glu Phe Gly  
115 120 125

His Asp Val Asp Arg Ala Asp Pro Val Glu Pro Gly Leu Thr Met Tyr  
130 135 140

Lys Gln Lys Arg Leu Val Arg Arg Val Ile Glu Glu Ser Gly Ile Pro  
145 150 155 160

Tyr Thr Tyr Ile Cys Cys Asn Ser Ile Ala Ser Trp Pro Tyr Tyr Asp  
165 170 175

Asn Cys His Pro Ser Gln Leu Pro Pro Pro Leu Asp Gln Leu His Ile  
180 185 190

Tyr Gly His Gly Asp Val Lys Ala Tyr Phe Val Asp Gly Tyr Asp Ile  
195 200 205

Gly Lys Phe Thr Met Lys Val Ile Asp Asp Glu Arg Thr Ile Asn Lys  
210 215 220

Asn Val His Phe Arg Pro Ser Asn Asn Cys Tyr Ser Met Asn Glu Leu  
225 230 235 240

Ala Ser Leu Trp Glu Asn Lys Ile Ala Arg Lys Ile Pro Arg Val Ile  
245 250 255

Val Ser Glu Asp Asp Leu Leu Ala Ile Ala Ala Glu Asn Cys Ile Pro  
260 265 270

Glu Ser Val Val Ala Pro Ile Thr His Asp Ile Phe Ile Asn Gly Cys  
275 280 285

Gln Val Asn Phe Lys Ile Asp Gly Ile His Asp Val Glu Ile Gly Thr  
290 295 300

Leu Tyr Pro Gly Glu Ser Val Arg Ser Leu Glu Glu Cys Tyr Glu Lys  
305 310 315 320

Phe Val Val Met Ala Ala Asp Lys Ile His Lys Glu Glu Thr Gly Val  
325 330 335

Thr Ala Gly Gly Gly Gly Thr Thr Ala Met Val Glu Pro Val Pro Ile  
340 345 350

Thr Ala Ser Cys  
355

<210> 17  
<211> 18  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 17  
aggaggctgc agtcaagg

18

<210> 18

<211> 19  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 18  
tgcctgaaat tgagaaacc 19

<210> 19  
<211> 18  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 19  
aaagctagcc ttgaagcc 18

<210> 20  
<211> 19  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 20  
tcggacataa ctcattgtgg 19

<210> 21  
<211> 18  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 21  
ttgggttgga gaataagg 18

<210> 22  
<211> 18  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 22  
tggacattta ttggttgc 18

<210> 23  
<211> 18  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 23  
tatcatgtct ggaaatgc 18

<210> 24  
<211> 19  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 24  
agattgcatc aaagaatgg 19

<210> 25  
<211> 17  
<212> DNA  
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<220>  
<223> Primer sequence

<400> 25  
ggtccaaaag ccaatcc 17

<210> 26  
<211> 18  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 26  
taagacgaga catagtgg 18

<210> 27  
<211> 18  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 27  
tattcactaa gcacatgc 18

<210> 28  
<211> 19  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 28  
tcatttctgc aataggagg 19

<210> 29  
<211> 18  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 29  
atccacctca ggtgaacc 18

<210> 30  
<211> 18  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 30  
aataggaggc tctgatgg 18

<210> 31  
<211> 18  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 31  
atccacctca ggtgaacc 18

<210> 32  
<211> 17  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 32  
aggctctgat ggcttgcc 17

<210> 33  
<211> 18  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 33  
atccacctca ggtgaacc 18

<210> 34  
<211> 30  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 34  
gaattctaga agatatggtg agtgtagctg 30

<210> 35  
<211> 30



<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 35  
gaattctaga atcacacatc ttatatagcc 30

<210> 36  
<211> 55  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 36  
ggggacaagt ttgtacaaaa aagcaggctt ctagaagata tggtgagtgt agctg 55

<210> 37  
<211> 55  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 37  
ggggaccact ttgtacaaga aagctggggtt ctagaatcac acatcttata tagcc 55

<210> 38  
<211> 33  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 38  
gaattctaga agaagaaata tgggagacga agg 33

<210> 39  
<211> 33  
<212> DNA  
<213> Artificial

<220>  
 <223> Primer sequence

<400> 39  
 gaattctaga aagacttcat gcacacaagt tcc 33

<210> 40  
 <211> 34  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Primer sequence

<400> 40  
 gaattctaga tgattcattg tttgtttcca taac 34

<210> 41  
 <211> 31  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Primer sequence

<400> 41  
 gaattctaga acatattcat cttcctatca c 31

<210> 42  
 <211> 31  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Primer sequence

<400> 42  
 gaattctaga tccaaattct cgtacctcac c 31

<210> 43  
 <211> 31  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Primer sequence

<400> 43  
gaattctaga tagttcacat ctctcggcag g 31

<210> 44  
<211> 37  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 44  
ggatcctcta gacactagt gtgtataagt ttcttgg 37

<210> 45  
<211> 35  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 45  
ggatcctcta gaccccctta gtcttaaaat actcg 35

<210> 46  
<211> 52  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 46  
ggggacaagt ttgtacaaa aagcaggctc tagaaagcaa agcaatggca cc 52

<210> 47  
<211> 51  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 47  
ggggaccact ttgtacaaga aagctgggtc tagatccacc tcaggtgaac c 51

<210> 48  
<211> 53  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 48  
ggggacaagt ttgtacaaaa aagcaggctc tagaaagcaa tggcaccagc agc 53

<210> 49  
<211> 51  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 49  
ggggaccact ttgtacaaga aagctgggctc tagatccacc tcaggtgaac c 51

<210> 50  
<211> 52  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 50  
ggggacaagt ttgtacaaaa aagcaggctc tagataaagc aatggcacca gc 52

<210> 51  
<211> 51  
<212> DNA  
<213> Artificial

<220>  
<223> Primer sequence

<400> 51  
ggggaccact ttgtacaaga aagctgggctc tagatccacc tcaggtgaac c 51

<210> 52  
<211> 36  
<212> DNA

<213> Artificial

<220>

<223> Primer sequence

<400> 52

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36

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